

UNITED STATES PATENT OFFICE.

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STARTER.

1,268,414.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH A. WILLIAMS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Starters, of which the following is a full, clear, and exact description.

This invention relates to spring starters for internal combustion engines, and especially the engines of motor vehicles, and is an improvement over the starter forming the subject matter of my prior application Serial No. 789,041, filed Sept. 11th, 1913.

The chief object of the present invention is to improve the construction and operation of the starter such as shown in my prior application. More specifically considered, the present invention aims to improve the construction and operation, and avoid liability of breakage in the pawl and ratchet mechanism forming the power transmitting means between the arbor of the spring and the starter shaft. Another of the more specific objects is to improve the rewinding mechanism in such a manner as to avoid the liability of breakage in the timing mechanism which forms the operative connection between the parts of the rewinding mechanism, and in reducing the noise incident to the operation of the rewinding mechanism.

My invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the drawings, wherein I have shown the preferred embodiment of the different features of my invention, Figure 1 is a vertical sectional view through the starter. Fig. 2 is a sectional view substantially along the line 2—2 of Fig. 1, looking in the direction indicated by the arrow. Fig. 3 is a sectional view substantially along the irregular line 3—3 of Fig. 1, looking in the direction indicated by the arrow, with the sub-cover removed. Fig. 4 is a sectional view substantially along the line 4—4 of Fig. 1, looking in the direction indicated by the arrow. Fig. 5 is an end view of the starter shaft and of the driving member on the starter shaft forming a part of the rewinding mechanism.

The starter includes a main casing 10 formed of sheet metal parts secured to-

gether, and a shaft 11 which is journaled in the casing and extends transversely there-through,—this starter shaft being designed to be connected by a suitable coupling 12 to the crank shaft of the engine to be started. The starter as a whole will be mounted at the front end of the motor vehicle, with the shaft 11 in axial alinement with the crank shaft. Within the casing 10 and surrounding the shaft 11 is a spring arbor 13 composed of two or more parts fastened together, this arbor being formed largely of sheet metal. The arbor is provided with bearing flanges which surround the shaft and which extend between the latter and bearing flanges on the front and rear walls of the casing, and it is provided also with an annular hub-like portion which is surrounded by a spiral spring 14, in which energy is adapted to be stored for starting purposes, this spring having its inner end secured to the arbor, and its outer end secured to the casing, as shown in Figs. 1 and 4.

The arbor is adapted to be connected to the starter shaft 11 for starting purposes by pawl and ratchet mechanism including a ratchet wheel 15 which is secured to the shaft within or between the two side members composing the arbor and by pawls 16 mounted upon pins 17 which are journaled in the said two side members of the arbor. The mechanism for controlling these pawls, that is for throwing them into engagement with the ratchet teeth to secure driving relationship between the arbor and the shaft 11, or to throw them out of engagement therewith, constitutes an important part of the present invention, and this mechanism will be described after the other main parts of the starter have been referred to in this general description of the starter as a whole.

Sufficient energy will be stored in the spring to start the engine under normal conditions, and as soon as the engine is started, the spring will be automatically rewound, by rewinding mechanism extending between the starter shaft and gearing on a rewinding shaft 18 journaled in one wall of the main casing 10, and in a bearing member 19 supported by a sub-cover or sub-casing 20. The rewinding mechanism includes a driving member 21 which is held by a pin to the shaft 11, so as to rotate therewith, and which is adapted to rotate an eccentric 22 when operatively connected thereto by timing mechanism to be referred to pres-